



The Effect of Using Interactive Methods in Teaching Chemistry to School Students on Educational Efficiency

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Abstract: In this article, "Properties of substances" in secondary schools. Methods of using modern pedagogical technologies on the topic "Physical and chemical changes" are described. The effectiveness of using these methods has been analyzed.

Key words: "BBB" table, "T" table, physical process, chemical process, pedagogical technology, non-traditional lesson.

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In modern conditions, it is appropriate to use innovative forms of education in order to strengthen the learning activities of students, increase the quality of teaching and improve their efficiency [1]. Today, practical games, problem-based learning, interactive learning, module-credit system, distance learning, blended learning and master classes are recognized as innovative forms of education [2,3].

Chemistry is related to nature and its laws are based on concrete experiments. Also, in addition to sufficient knowledge and experience, it is very important to use pedagogical technologies to explain these laws.

Interactive education has the following possibilities:

- arouses students' interest in acquiring knowledge;
- motivates every participant of the educational process;
- has a positive effect on the psyche of every student;
- creates favorable conditions for thorough assimilation of educational material;
- has a multifaceted effect on students;
- awakens students' thoughts and attitudes on topics;
- forms vital skills and qualifications in students;
- ensures that students' behavior is changed in a positive direction [4,5].

"Properties of substances" in general schools. "**Physical and chemical changes**" theme was used on the basis of modern pedagogical technologies, **B/B/B** and **T** tables, as well as the interactive method "**ripe grapes, enter the garden**" to strengthen these concepts. In this sense, in the teaching of complex topics for schoolchildren, it is possible to effectively use several pedagogical methods, including graphic organizers, which give the learner the opportunity to master the topic [6].

Properties of substances. Using the B/B/B table in teaching the topic "Physical and chemical changes". — B/B/B" (I know/I want to know/ I learned) method is one of the methods of interactive teaching and mastering of the subject, which is presented to the learner in the form of a table and is performed. After the topic is announced, the B/B/B table will be distributed to students. First, they write the information they know in the "I know" part of the table, and what other information they want to know about the topic, they write it in the "I want to know" part of the table.

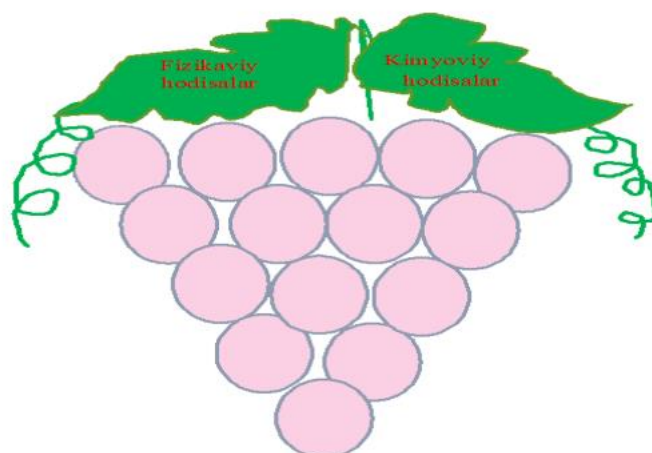
Then, they are distributed the text related to the topic. They learn the text independently in microgroups and fill in the "I learned" part of the table. The leader (representative) of each microgroup will present the compiled tables. All parts of the table are compared, the information available to the learners and the additional acquired information are compared and discussed, and the level of mastery of the subject is analyzed.

Table 1. Analysis of problems based on the "B/B/B" table.

№	Questions	I know	I want to know	I found out
1	What is a physical phenomenon?	+		
2	What is a chemical reaction?		+	
3	What is the process of turning milk into yogurt?			+
4	What is the process of iron rusting?			+
5	What is the process of dissolving sugar?			+

Properties of substances. Using the T table in teaching the subject "Physical and chemical changes". It is convenient to use this technology in the final part of lectures and practical exercises. In this case, it becomes possible to approach the solution of a problem from different opposite points of view (positive and negative, advantage and disadvantage, profit and loss, right and wrong). For example: the teacher shows the mixed correct and incorrect answers on the screen, asks the students sitting at one desk to write them on the table together, and then the students at the next desk (small groups) and suggests that they make additions. After the work is completed, a table with correct and incorrect answers will be displayed on the screen. Students compare their answers with the table on the screen and come to appropriate conclusions.

Properties of substances. Using the method "The grapes are ripe, go to the garden" in teaching the topic "Physical and chemical changes".



Picture 1. Scheme of the method "Enter the ripe grape garden".

In order to use this method, the terms were first scientifically defined. A physical phenomenon is a special property of matter or bodies: the aggregate state of the substance, the state of its shape and location change. In physical phenomena, new matter is not formed. Chemical phenomenon - the phenomenon of transformation of one substance into another substance or substances. Examples of these concepts are given. Cards with the shape of "grapes" were distributed to the students. Task: to write examples of phenomena on grape seeds based on the events that the students themselves have encountered in life, physical phenomena on the right side of the "grape" base, and chemical phenomena on the left side.

This method was conducted among 12-13 year old students. Table 3 shows the obtained results.

Table 3.

groups	number of students	He wrote the same thoughts number of students		Readers who wrote new thoughts	
		Traditional	Unconventional	Traditional	Unconventional
Group 1	28	26	20	2	8
Group 2	19	15	12	4	7
Group 3	30	26	23	4	7

Based on this table, it can be concluded that this method has a positive effect on improving students' competence in life. After 3 months, when the above students were asked about this topic, 70-75% of them answered the questions without difficulty.

It is necessary to choose the most convenient and effective method to use in teaching each topic, to be able to work in cooperation with the learner in explaining the topic, and in the end, it is necessary to achieve that the topic is interesting, simple and, of course, fully explained. The bottom line is that chemistry is a science that requires explanation based on concrete evidence. In order to enable students to master the science in depth, the teacher should be able to use pedagogical technologies appropriately in the teaching of chemistry both in secondary general education schools and, of course, in higher education.

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